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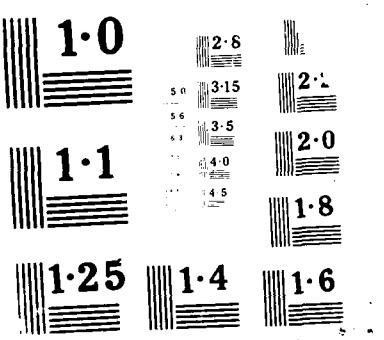
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This report describes the MicroVAX II-based computational equipment funded by the U.S. Air Force Office of Scientific Research and installed at Drexel University. This equipment is dedicated exclusively for computational mechanics for composites materials research. Owing to its large computing capacity and availability to perform intensive computational tasks at substantially lower unit cost, this equipment has casted positive impact on current AFOSR programs and other research work conducted at Drexel University. To short, this computational equipment has already enhanced the quality and the quantity of composite materials research at Drexel University.

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Computation Equipment for Damage Simulation in Laminated Composites

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FOREWORD

This report describes the MicroVAX II-based computational equipment funded by the Air Force Office of Scientific Research and installed at Drexel University. This equipment is dedicated exclusively for computational mechanics for composite materials research. Owing to its large computing capacity and availability to perform intensive computational tasks at substantially lower unit cost, this equipment has casted positive impacts on current AFOSR programs and other research work conducted at Drexel University. In short, this computational equipment has already enhanced the quality and the quantity of composite materials research at Drexel University.

INTRODUCTION

In 1987, a computer system has been requisitioned through funding from AFOSR/URIP dedicated to support extensive computations for studying damage mechanics in composite materials. This system was based on Digital Equipment Corporation's MicroVAX II model with a 32-bit CPU architecture. Since its installation, this facility has significantly enhanced our capability and productivity in research on damage mechanics in composites. Owing to its large computational capacity and instant availability, substantially more computational simulations covering a wide range of parameters can now be performed. Consequently, the accentuated stress fields associated with local damage mechanisms and their subsequent growth behaviors can also be examined in more detail.

COMPUTATION EQUIPMENT FOR COMPOSITE MATERIALS RESEARCH

With funds provided by AFOSR and a matching fund from Drexel University, a system-package purchase arrangement was made with Hamilton Avnet Electronics Corporation of Cherry Hill, N. J.

The hardware components and software in the MicroVAX II system are:

- MicroVAX II 32-bit CPU
- Floating Point Processing Unit
- 13 M bytes of RAM memory
- 8 slot Q-bus backplane
- 16 line serial communication board
- 71 M bytes 5.25 Winchester disk
- 380 M bytes 5.25 Winchester disk with ESDi controller

- 95 M bytes Compactape cartridge backup system
- 6250/1600 bpi reel-to-reel streaming tape transport with controller
- Laser printer with 300 by 300 dots-per-inch, Tektronix-compatible bit-map graphics capability
- 2 medium resolution graphics terminals
- Esprit terminal, with slave serial dot-matrix printer, serving as system console
- 60" system cabinet with power supply
- MicroVMS operating system
- Fortran compiler

In addition, 2 Macintosh personal computers were also purchased through Drexel University Equipment Support Group at a discount price. These two units served as both stand-alone workstations and remote terminals to the MicroVAX II system.

The MicroVAX II facility is currently housed in the Computation Laboratory for Composite Materials Research. It is directly connected to the VAX-750 Computer maintained by the Department of Mechanical Engineering and Mechanics. This linkage affords direct access to the storage and software library of the VAX-750. Plans are being made to network the MicroVAX II system to the new IBM 3090 super-mainframe (configured with vector processor) now being installed at Drexel University Computing Services. Through telephone connection, access to NSF national supercomputing centers is also being planned.

An array of computational softwares has been installed in the MicroVAX II system. This includes both general purpose packages and special in-house developed programs. There are finite element codes for two-dimensional and three-dimensional crack growth simulations, for impact fracture simulations, for linear and nonlinear analysis of time-dependent behaviors; there are finite difference codes for asymptotic singularity analysis in the elastic and plastic ranges, and other codes for mechanistic and probabilistic simulation of failure processes.

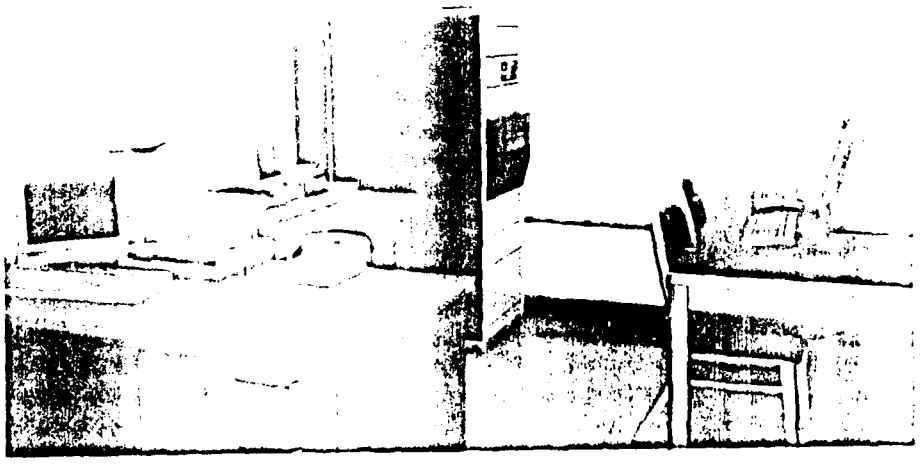
Some photographs of the MicroVAX II system at the Computation Laboratory for Composite Materials Research are shown in the Appendix.

CONCLUSION

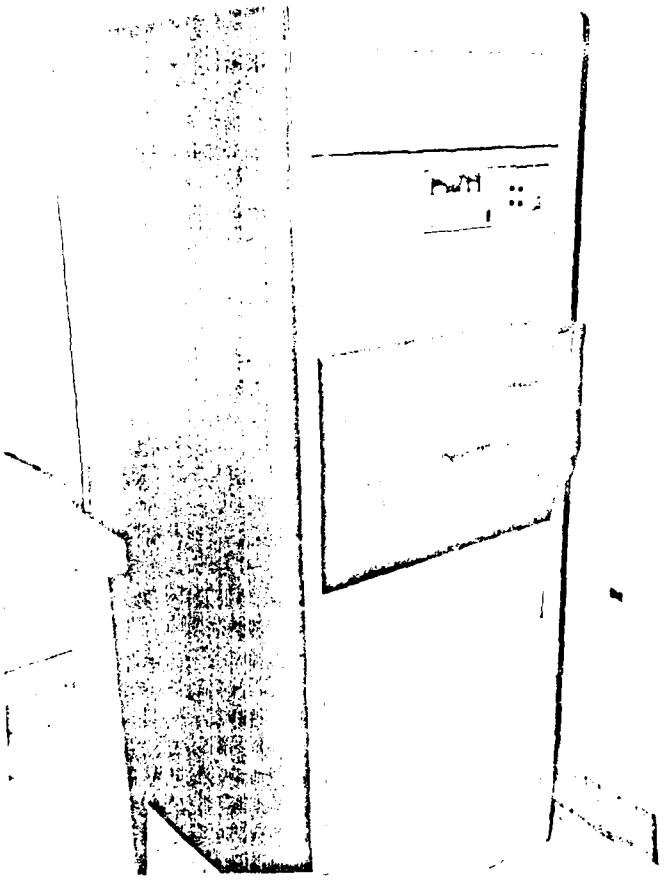
The dedicated MicroVAX II-based equipment furnishes the necessary capability to perform computational intensive tasks in mechanics of advanced composite materials at substantially lower unit cost to our sponsor. Making this computing equipment available has already yielded a definitive enhancement to the composite materials research thrusts at Drexel University.

APPENDIX

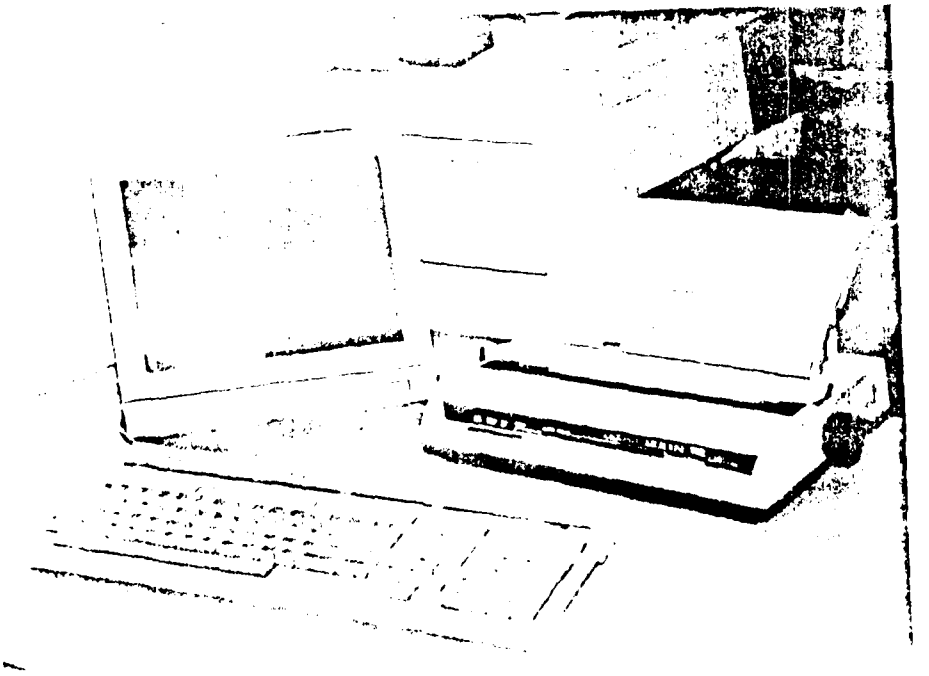
Photographs of MicroVAX II system in Computation Laboratory for Composite Materials Research



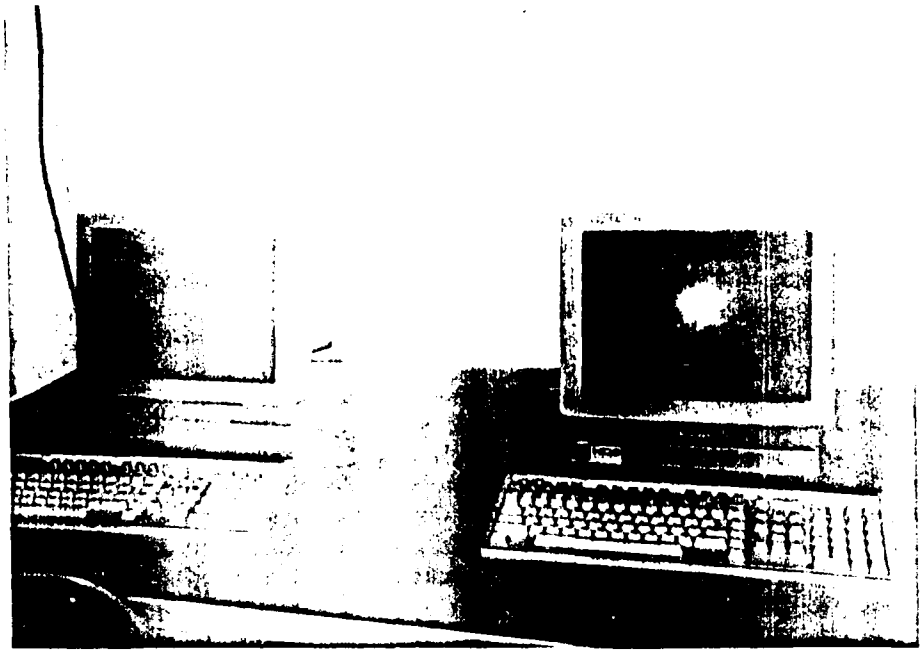
MicroVAX II system



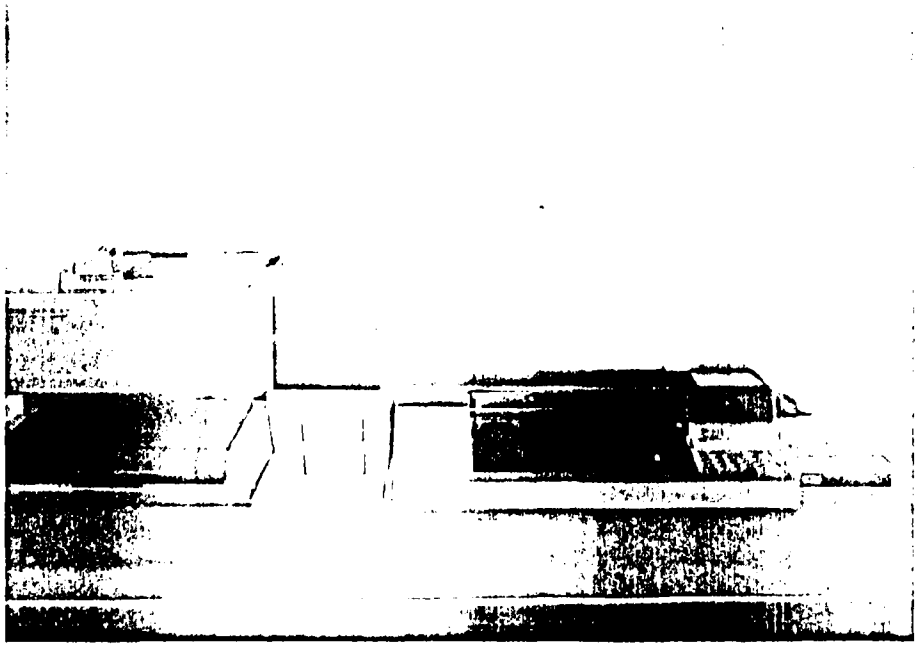
MicroVAX II, disk drives and tape drives in system cabinet



Console terminal and printer



Graphics terminals



Laser printer, pen plotter and modem

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